



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/747,601

12/29/2003

Dong Yeal Keum

SUN-DA-128T

6479

23557

7590

01/22/2009

SALIWANCHIK LLOYD & SALIWANCHIK

A PROFESSIONAL ASSOCIATION

PO Box 142950

GAINESVILLE, FL 32614

EXAMINER

JEFFERSON, QUOVAUNDA

ART UNIT

PAPER NUMBER

2823

MAIL DATE

DELIVERY MODE

01/22/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/747,601	Applicant(s) KEUM, DONG YEAL	
	Examiner QUOVAUNDA JEFFERSON	Art Unit 2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 September 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 2 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 2 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al, US Patent 6,931,980, in view of Kwon et al, US Patent Application Publication 2003/0045061 (both as cited in a previous Office Action).

Regarding claim 1, Wu teaches a method for fabricating a transistor comprising of forming a gate electrode **310** on a semiconductor substrate, forming a first preliminary source/drain region **316/318** and a pocket junction region **324/326** through a first ion implantation process using the gate electrode as a mask, the pocket junction region being formed under the first preliminary source/drain region (figures 13 and 14), forming a first oxide layer **328** on the substrate including the gate electrode, forming a nitride layer **330** on the first oxide layer, forming a second oxide layer **332** over the nitride layer (figure 17), forming spacers on sidewalls **334/336** of the gate electrode, forming a second preliminary source/drain region **344** through a second ion implantation process using the spacers as a mask and removing the nitride layer and the first oxide

Art Unit: 2823

layer on the surface of the substrate such that the nitride layer and the first oxide layer remain on the substrate only below the spacers after forming the second preliminary source/drain region through the second ion implantation process using the spacers as a mask (figure 21).

Wu fails to teach removing the nitride layer and the first oxide layer on the surface of the substrate after forming the second preliminary source/drain region through the second ion implantation process using the spacers as a mask and diffusing substantially all of the implanted ions in a horizontal direction of the substrate by performing a thermal treatment process for the resulting substrate.

Kwon teaches removing the nitride layer **200** and the first oxide layer **161** on the surface of the substrate (figure 10) after forming the second preliminary source/drain region **230** through the second ion implantation process using the spacers **215** as a mask (figures 7-9) by teaching the use of a series of insulation layers that are deposited over the substrate, including the gate electrode, to form a spacer layer. The top insulation layers are formed into spacer while the two bottom insulation layers remain on the surface of the substrate during the second source/drain implantation process to prevent crystalline defect and ion channeling from occurring during the second high concentration ion-implantation process. After this process, since they are unnecessary, the first and second insulation are etched off the top surface of source/drain region and diffusing substantially all of the implanted ions in a horizontal direction of the substrate

Art Unit: 2823

by performing a thermal treatment process for the resulting substrate [0042-0045] by teaching the performance of an annealing process, which not only diffused ion implantations performed in the substrate, the annealing process is also performed to recrystallize damage to the substrate during the ion implantation process

It would be obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Kwon with that of Wu because the two bottom insulation layers remain on the surface of the substrate during the second source/drain implantation process to prevent crystalline defect and ion channeling from occurring during the second high concentration ion-implantation process. After this process, since they are unnecessary, the first and second insulation are etched off the top surface of source/drain region and by teaching the performance of an annealing process, which not only diffused ion implantations performed in the substrate, the annealing process is also performed to recrystallize damage to the substrate during the ion implantation process

Regarding claim 2, Kwon teaches performing a thermal treatment process prior to the removal of the nitride layer and the first oxide layer [0044-0045].

Response to Arguments

Applicant's arguments filed September 26, 2008 have been fully considered but they are not persuasive.

With regards to claims 1 and 2, Applicant traverses the 35 USC 103(a) rejection made using the cited prior art of Wu (USP 6,931,980) and Kwon (USPAP 2003/0045061). In particular, Applicant argues that the reference of Kwon "...does not cure the admitted defects of Wu et al. In particular, layer 200 of Kwon et al. is an oxide layer, not a nitride layer that is removed after forming the second preliminary source/drain region as claimed. In fact, Kwon et al. removes the nitride layer 210 before forming the second preliminary source/drain region, and then removes oxide layers 200 and 161. The two bottom insulation layers of Kwon et al. are formed of the same material - oxide - and can be removed by the same etching process. By being formed of the same material, these layers may be indistinguishable on the surface of the second preliminary source/drain region. Therefore, there is no teaching or suggestion to remain a first oxide layer and a nitride layer, such that the nitride layer and the first oxide layer are removed from the surface of the substrate after forming the second preliminary source/drain region..."

In response to this argument, Kwon teaches that layer 200 is a first insulating layer. While Kwon states that first insulating layer 200 is preferably made of silicon

Art Unit: 2823

oxide, Kwon also states “Although the preferred embodiments of the present invention have been described, it is understood that the present invention should not be limited to these preferred embodiments but various changes and modifications can be made by one skilled in the art within the spirit and scope of the present invention as hereinafter claimed...” (Paragraph 49). At the time of the invention of Kwon, the use of silicon nitride as an insulating layer, which is what second and third insulating layers 210 and 220 are made of, was generally known to one skilled in the art. Therefore, Kwon does indeed suggest that layer 200 may be made manufactured using a silicon nitride, and meets Applicant’s claimed limitation of “...to remain a first oxide layer and a nitride layer, such that the nitride layer and the first oxide layer are removed from the surface of the substrate after forming the second preliminary source/drain region...” since layers 200 and 161 are removed after the source/drain implantation 230 (as shown in figures 9 and 10).

Therefore, the rejection of claims 1 and 2 under 35 USC 103(a) as unpatentable over the cited prior art of record is deemed proper.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to QUOVAUNDA JEFFERSON whose telephone number is (571)272-5051. The examiner can normally be reached on Monday thru Friday 7AM-3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2823

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michelle Estrada/
Primary Examiner, Art Unit 2823

QVJ